

ACF Industries
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10-83

Report on the Assessment of
the Stencil Cleaning Area at
the ACF Industries, Inc. Site
St. Louis, Missouri

Prepared for
ACF Industries, Incorporated
AMCAR Division
Earth City, Missouri

October, 1983

Rollins Environmental Service (TX) Inc.
Field Services Group
Deer Park, Texas

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ST. LOUIS, MO

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CLEANING AREA BY ROLLINS ENVIRON-
MENTAL SERVICE (TX) INC

10/83

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UPERFUND RECORDS

10/83

INTRODUCTION

Rollins Environmental Services (TX) Inc. was retained by ACF Industries, Inc. AMCAR Division on August, 1983 to provide project management for the assessment and clean-up of abandoned stencil cleaning area at the ACF facility in St. Louis, Missouri. We designed our assessment program to specifically address:

1. The vertical and horizontal extent of the contamination from this facility.
2. The potential for and/or existence of ground-water contamination as a result of this facility.
3. The shallow lithography associated with the area of contamination (defining boundaries).
4. The remedial action alternatives for ACF.

The field program for this assessment was completed by September 21, 1983 and the documentation and data evaluation contained in this report reflects this effort.

WORK PERFORMED

The field program, September 19 through September 21, 1983 included:

1. The boring of 4-6" diameter holes for the purpose of defining the shallow lithography in the immediate vicinity of the facility. These borings were made with a 6" hollow stem auger equipped drilling rig. Undisturbed samples of the subsurface were collected ahead of each 5' auger flight with a split-spoon sampler. These spoon samples were qualitatively analyzed on-site for water content, sand, silt or clay consistency and general organic content (based on a reading from a HNU analyzer, Model PI 101). These borings were then converted to monitoring wells. (Figure 1)
2. The installation of 4-2" monitoring wells for determining the potential for and/or existence of ground-water contamination. The monitoring wells are 2" PVC, flush threaded pipe with 10 feet of 20 slot screen. The zone being monitored is a relatively thin, shallow sand lens approximately 70 ft. from the surface, presumed to be contiguous over the assessment area.

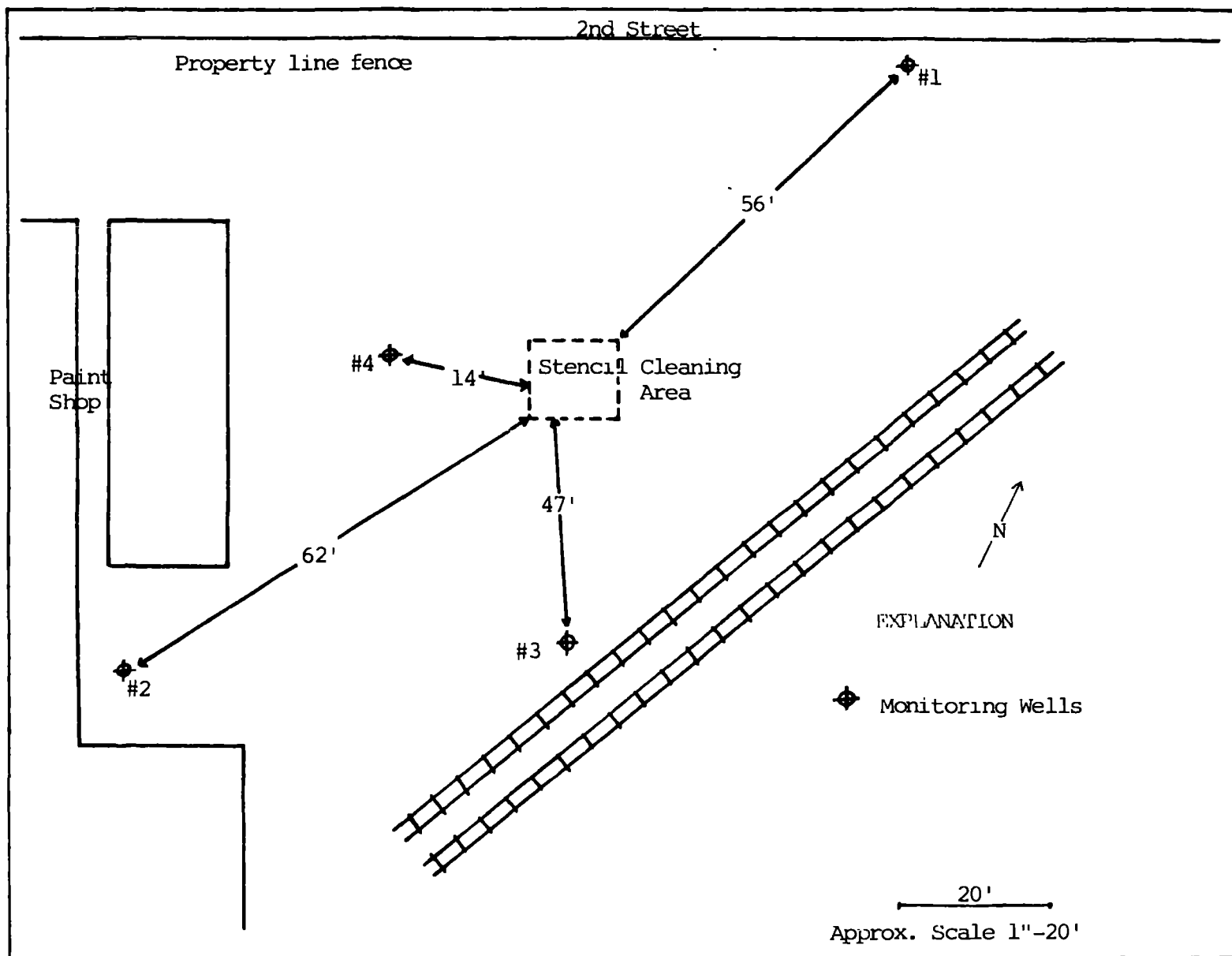


Figure 1
Location of Borings/Monitoring Wells
ACF, St. Louis, Missouri

3. The boring of 16-6" diameter holes (2-4' average depth) to further define the areal extent of the solvent contamination. The HNU meter was used in these holes for qualitative identification of solvent contaminants. (Figure 2)
4. The analysis of 4 ground-water and 6 soil samples for the solvents identified in the proposal as suspected contaminants (benzene, xylene, toluene, trichloroethylene, perchloroethylene, acetone, methanol and methylene chloride).

The construction data for the wells is depicted in a generalized drawing (Figure 3) lithologic logs of the soil borings are given in Appendix A.

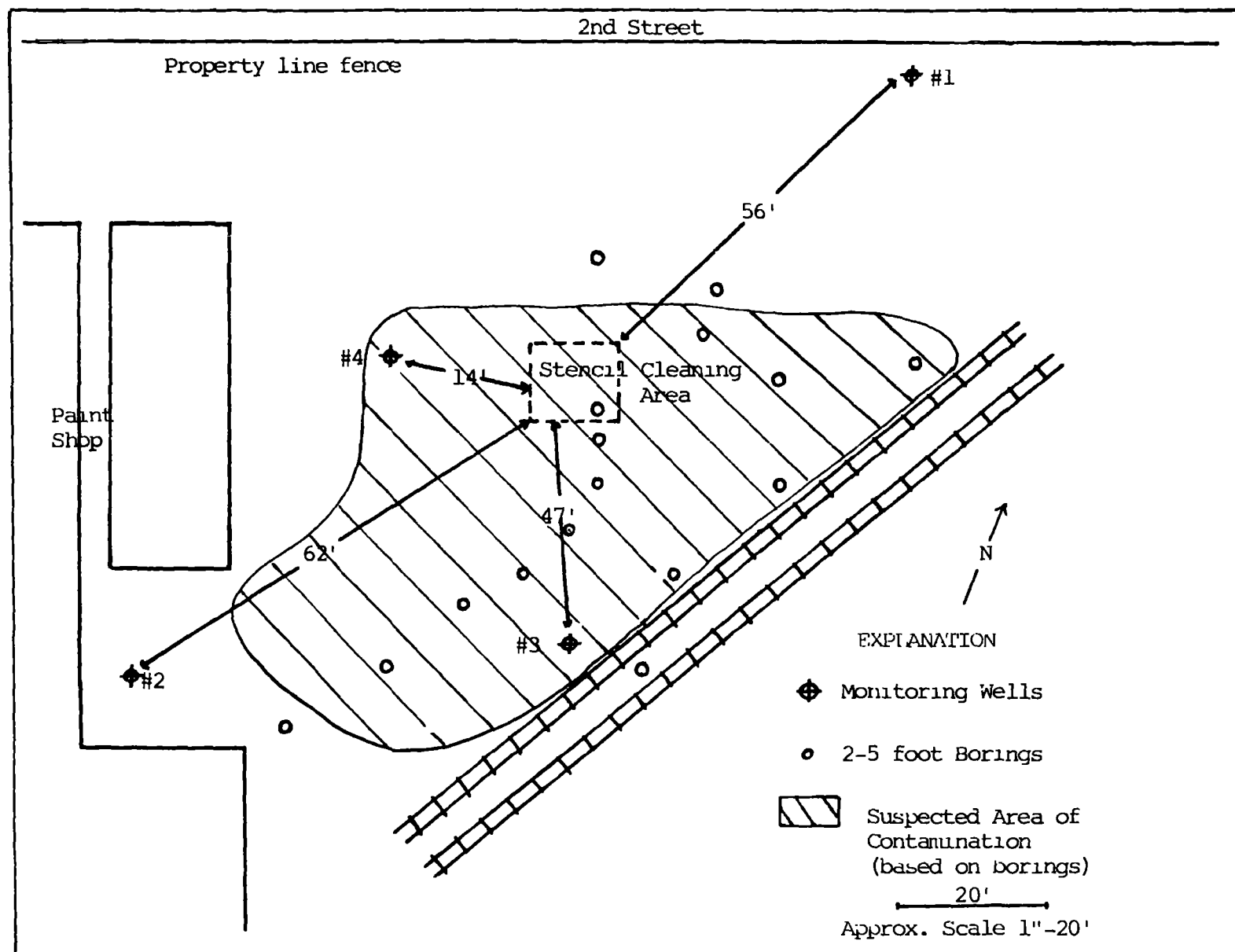


Figure 2
Suspected Solvent Contamination Area
ACF, St. Louis, Missouri

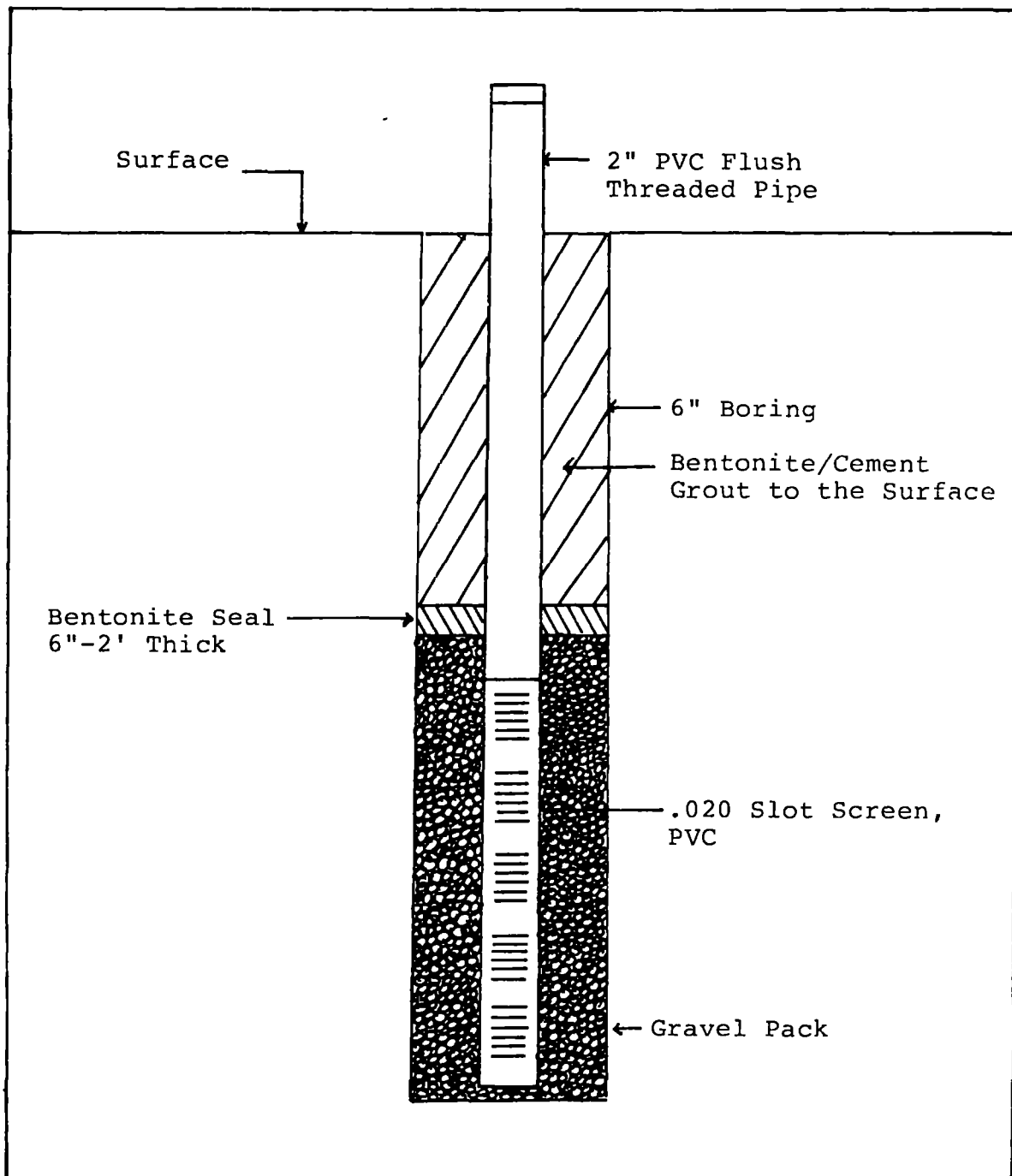


Figure 3
Generalized Well
Construction Diagram

HYDROGEOLOGIC SETTING

The assessment area is situated at the south west corner of the facility approximately 1 mile from the Mississippi River. The contaminated material is apparently a fill/cinder material from a previous site owner which is from 1-4' thick below the surface. This material is underlayed by a clayey silt formation containing sand veins, which may connect with the silty clay zone of 15-20' below the surface. The subsurface lithography is defined in Figure 4, based on the 4 borings and subsequent lithologic logs (Appendix 1) completed 9/19/83 - 9/21/83.

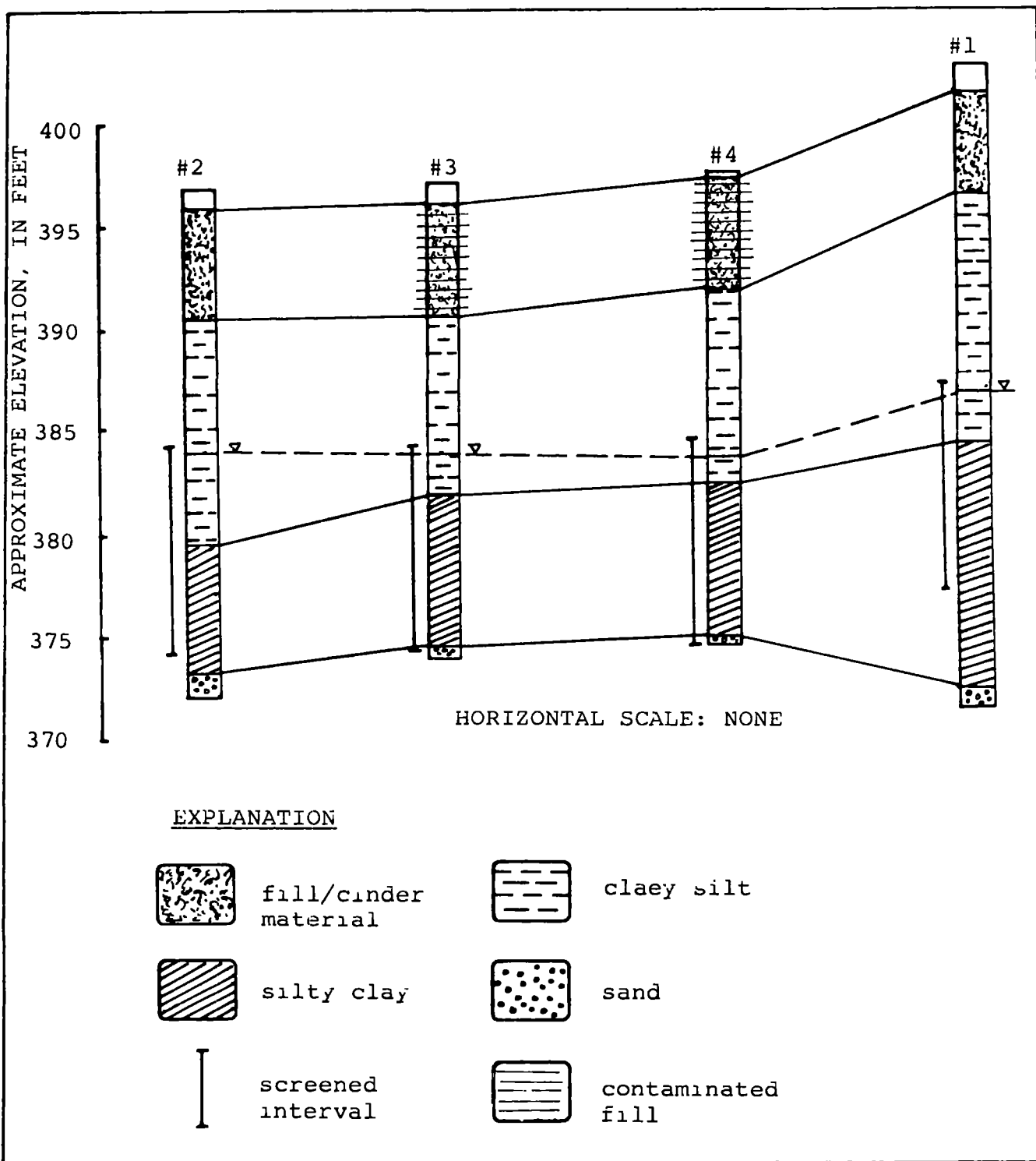


Figure 4
Geologic Section,
ACF Site, St. Louis, Missouri,
9/19/83-9/21/83

CHEMICAL ANALYSIS

Four ground-water samples were collected on 9/21/83 and delivered to Industrial Testing Laboratories, St. Louis, Missouri, for the analysis of; methylene chloride, trichloroethylene, perchloroethylene, benzene, toluene and xylene. These samples were extracted in hexane and analyzed by gas chromatography. Qualitative identification was made by peak retention time matching and quantification was indirectly calculated from internal standards. The results of this analyses are contained in Table 1. The gas chromatograms are contained in Appendix II.

Six soil samples were collected on 9/19/83 through 9/20/83 for the purpose of defining the contaminated soil area and identifying the major volatile components. Samples were analyzed by NUS Laboratories in Clear Lake City, Texas using the EPA method for determining solvents in hazardous waste site samples (ENSL/LV Method 1). The results of this analytical work is presented in Table 2. (Sample locations in Figure 5.)

Well #	B2	B3	B4	B1
Depth Collected (ft)	18-19	13-14	13-14	15-16
Water Level (ft) (Ground Surface to Water Surface)	17.86	12.58	12.97	14.91
Distance From Center of Source (ft)	72	47	16	66
Volitile Component MG/L (PPM)				
Triclene	-	-	55	
Perclene	-	56*	-	11*
Methylene Chloride	-	-	1.3	8
Benzene	-	9*	-	2*
Toluene	-	4	5	48
Xylene	-	1	3	14

*Peak retention times are too close to discriminate, therefore probable concentrations are calculated for both.

Table 1
Analytical Data for Ground-Water Samples
Collected 9/21/83 at the ACF Industries Site, St. Louis,
Missouri

<u>Sample Location</u>	<u>Triclene</u>	<u>Volitile Component* Perclene</u>	<u>Toluene</u>
2A	0	160	0
3A	0	20	0
4A	50	50	0
5A	0	0	400
6A	0	260	330
7A	160	220	390

*EPA Method ENSL/LL Method 1

Table 2

Analytical Data for Soil Samples Collected
9/19/83 - 9/20/83 at the ACF Industries Site,
St. Louis, Missouri

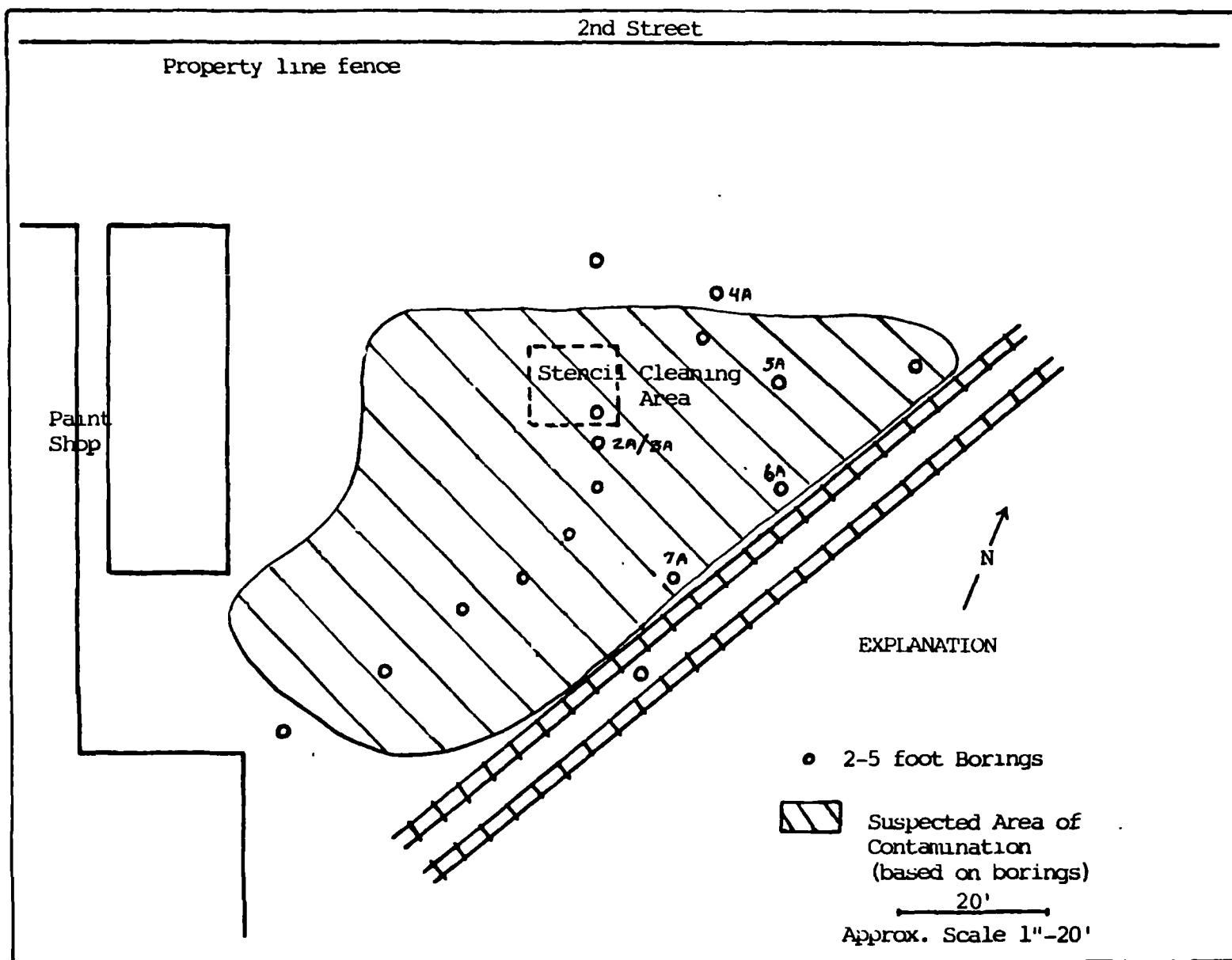


Figure 5
Boring Locations Used for Soil Sample
Collection, ACF Industries, St. Louis, Missouri

DATA EVALUATION

A comparison of the original affected area to the analytical results reveals a substantially larger contaminated area than initially anticipated. The area defined by in-field testing with the HNU meter (Figure 2) is 10X the size of the area used to clean stencils.

The contamination is generally confined to the area west of the railroad tracks, east of the paint shop and south of the property line off of 2nd Street. The vertical boundary for the majority of the material is the silty clay formation at 4-5' below the surface. The total surface area affected is approximately 3600-5000 ft² (4' thick) or 500-750 yd³.

The ground-water data indicates some solvent contamination in the subsurface (>50 ppm) and limited to a similar sized area. The ground-water plume appears to flow in a direction opposite of the soil contamination, but may be only slightly effected by the hydraulic gradient.

The soil samples collected indicate a high residual of toluene, perchloroethylene and trichloroethylene in the contaminated area with only minor amounts <10 ppm of the other solvents used.

RECOMMENDATION/REMEDIAL PLAN

The remedial plan for the stencil cleaning facility at the ACF plant in St. Louis, Missouri, can be outlined in three major steps:

1. Filing a remediation plan with the regulatory agency including:
 - a) a quality assurance program which will use in-field testing procedures to maximize the efficiency of waste removal.
 - b) A remedial plan which will define for the agency the removal, handling, and final disposal of the waste material
 - c) a post-remediation reporting plan.
2. Removal/handling disposing of the waste on-site.

RES feels that the removal of the point source, the contaminated soil as delineated by the HNU scan, should suffice for the clean-up of this area. The removal of this point source should remove 90-95% of the contaminated material. To remove the additional 5-10%, if it was possible, would require a much larger economic commitment with little chance of

environmental improvement. The ground-water contamination is minimal and the removal and clean-up of this medium would be only slightly effective based on the location of this perched water zone and its proximity to the Mississippi River.

3. Post-remedial/remedial monitoring.

One more around of ground-water samples should be collected and analyzed during the removal of the source. This analysis should be done to confirm the results from the first analyses.

Appendix I

Date Drilled: September 19, 1983

LITHOLOGIC LOG OF SOIL BORING/WELL NUMBER 1

<u>Description</u>	<u>Depth (ft)</u>	<u>SS Depth (ft)</u>	<u>Remarks</u>
Fill Material, cinders Brown to Gray, Dry.....	0-5	4-5.5	No solvent odor, but strong organic odor
Silty clay carbonaceous material Dark gray, damp.....	5-10	9-10.5	Organic odor Not Solvents
Silty clay, green gray damp.....	10-15	14.0-15.5	Organic odor Not Solvents
Clayey silt w/fine sand green gray, wet.....	15-20	19-20.5	No organic odor
Clayey silt w/fine sand green gray, wet.....	20-25	24-25.5	No organic odor
Sand w/silty clay red brown to gray, wet.....	25-30	29-30.5	Sand strong oxidation to + 30.0, unoxidized from 30.0
Sand, gray, wet.....	30-25	34-35.5	

Date Drilled: September 19, 1983

LITHOLOGIC LOG OF SOIL BORING/WELL NUMBER 2

<u>Description</u>	<u>Depth (ft)</u>	<u>SS Depth (ft)</u>	<u>Remarks</u>
Clayey silt, gray w/cinders on top 4.0-4.1....	0-5	4-5.5	
Silty clay w/trace fine sand.....	5-10	9-10.5	
Sandy silt w/some silty sand, some clay	10-15	14-15.5	Moist at 14'
Sandy clay to 19.3' then brown sand w/silt.....	15-20	19-20.5	Water @ 17'
Sandy silt, some of silty sand.....	20-25	24-25.5	

Date Drilled: September 20, 1983

LITHOLOGIC LOG OF SOIL BORING/WELL NUMBER 3

<u>Description</u>	<u>Depth (ft)</u>	<u>SS Depth (ft)</u>	<u>Remarks</u>
Cinders & Gray silty clay...	0-5	4-5.5	No SS Recovery
Silty clay, gray w/oxidation.....	5-10	9-10.5	Some Volatile Organic Smell
Fine Silty Sand, Brown & Sandy Silt.....	15-20	19-20.5	Hit Water @ 18'

Date Drilled: September 20, 1983

LITHOLOGIC LOG OF SOIL BORING/WELL NUMBER 4

<u>Description</u>	<u>Depth (ft)</u>	<u>SS Depth (ft)</u>	<u>Remarks</u>
Cinders to Gray Clay.....	0-5	4-5.5	Some Hydrocarbon odor
Clay & Silty clay, gray w/traces of fine sand.....	5-10	9-10.5	Hydrocarbon odor
Fine Silty Sand & Clayey silt seams.....	10-15	14-15.5	Wet Sample Strong Hydrocarbon Odor
Silty Clay, gray, to 19.5 to silty sand.....	15-20	19-20.5	Some Hydrocarbon Odor
Fine sand w/trace silt, brown.....	20-25	24-25.5	

Appendix II

TEMP1 88 88
 TIME1 15.5
 RATE 10.00
 TEMP2 100
 TIME2 5.5
 INJ TEMP 250 250
 FID TEMP 250 250
 TCE TEMP 250 250
 OVEN MAX 275

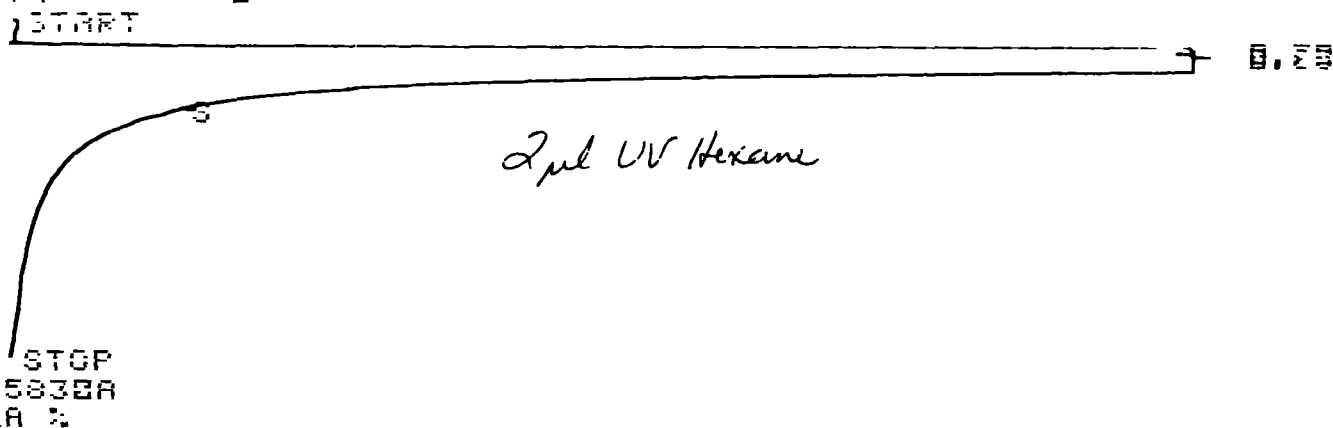
CHT SPD 5.50
 ATTN 2+ 5
 FID SGNL +8
 SLP SENS 0.00
 AREA RES 100
 FLOW A 2
 FLOW B 40
 OPTN 2

Industrial Testing Laboratories

Client: *Rollins* Environmental Date: 10/4/83

Report No: 83-9-271 Lab No: 44136-39

6 ft. 10% TCEP
 2ul injection



2ul UV Hexane

RT	AREA	AREA %
5.73	21720000	98.718
5.83	200000	1.282
NF: 1.0000 2+ 5		

PART NO. LR-508-8735
 SEALO NEW YORK

START

8.83

2.46

2ul 1 B2 Extract
100ml extracted with 5ml hexane

615P82

PF 5832A
AREA %

RT	AREA	AREA %
8.78	215788888	98.824
8.83	2528888	1.158
2.46	38838	0.018

MF: 1.0000 E+ 8

RATE 8 @
START

8.00

8.00

2 ml 2B3 Extract

9.66

STOP
5838A
AREA %

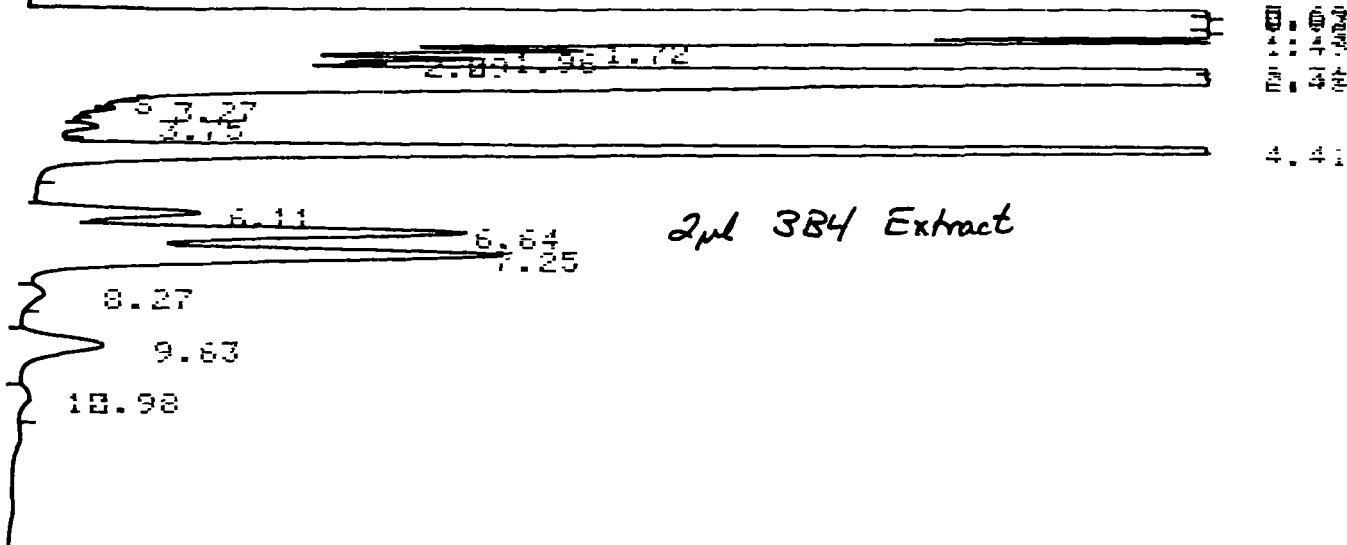
RT	AREA	AREA %
8.69	216688888	98.188
8.83	2884888	1.387
9.45	869288	3.394
9.78	161888	5.673
9.92	88128	3.831
10.12	11848	3.885
10.65	11238	3.885
10.24	8936	3.884
10.66	1635	3.881

perylene or 8.6 ppm benzene
toluene

xylene

NF: 1.8888 E+ 8

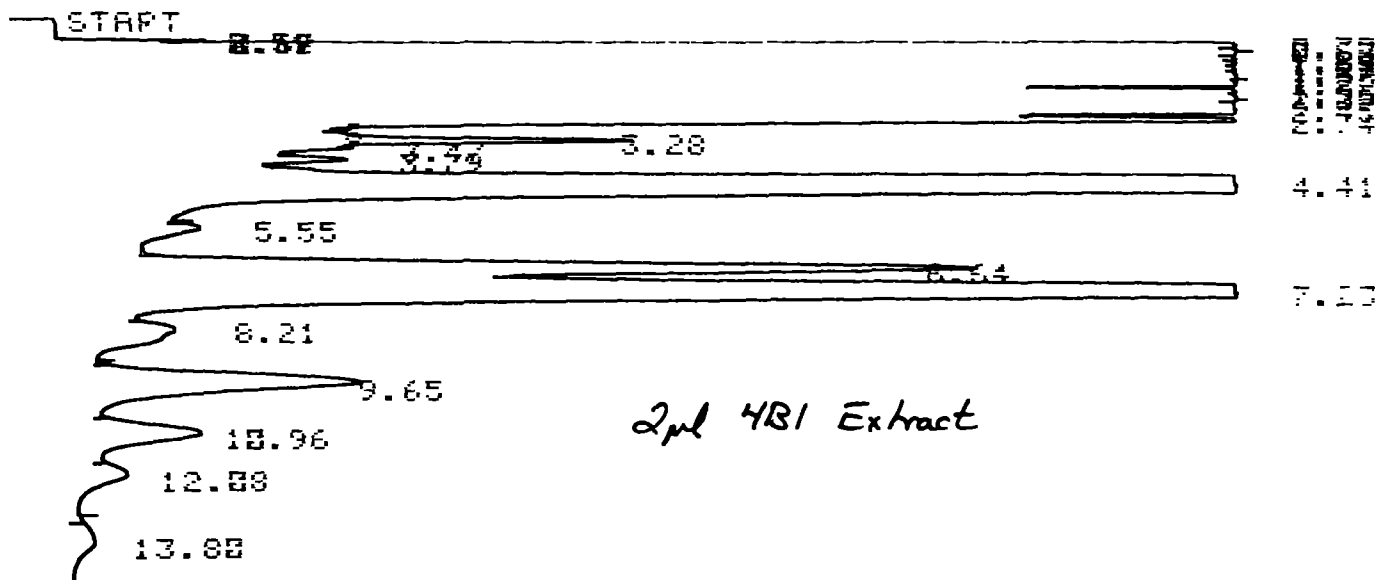
START



5838A
AREA %

RT	AREA	AREA %	
3.69	214500000	96.149	
3.83	2725000	1.238	
1.19	6000	0.003	
1.49	11000	0.005	
1.72	3874	0.002	
1.96	2581	0.001	1.3 ppm
2.39	354	0.000	
2.31	186900	0.006	55 ppm
2.45	942000	0.431	trichloro
3.27	229	0.000	
3.75	986	0.000	
4.41	89000	0.041	5.1 ppm
6.11	10340	0.005	
6.64	31990	0.015	
7.25	41000	0.019	3.2 ppm
8.27	2015	0.001	
9.63	9010	0.004	
12.98	1205	0.001	

MF: 1.0000 E+ 0



5838A
AREA %

RT	AREA	AREA %
3.55	1227	0.001
3.63	274	0.000
3.73	216288888	97.589
3.83	3266888	1.474
4.41	157388	0.071
5.55	141588	0.064
6.64	81428	0.037
8.21	233188	0.105
9.65	88888	0.037
10.96	16498	0.007
12.58	31628	0.014
13.88	139488	0.063
8.0 ppm	32618	0.014
10.7 ppm	18528	0.008
14.4 ppm	1439	0.001
48 ppm	2798	0.001
toluene	837288	0.378
benzene	2188	0.001
xylene	61798	0.028
paraffins	185888	0.084
aromatics	8416	0.004
aliphatics	38138	0.014
ketones	13438	0.006
aldehydes	5817	0.003
esters	2754	0.001

MF: 1.0000 E+ 0

START

0.00

Methylene Chloride 1.34 mg/L
Trichloroethylene 1.46 mg/L
Perchloroethylene 1.62 mg/L

STOP

HP 5830A
AREA %

2 µl each/100 ml hexane

Standard conc. based upon 20:1
extraction ratio

RT	AREA	AREA %
0.69	215800000	98.864
0.83	2468000	1.131
1.96	2774	0.001
2.29	4931	0.002
2.76	4646	0.002

MF: 1.0000 E+ 0

START

0.00

2.75 Benzene 0.88 mg/L
4.40 Toluene 0.87 mg/L
6.67 7.23 Xylene 0.87 mg/L

2 µl each/100 ml hexane

Standard conc. based upon 20:1
extraction ratio

9.63

STOP

HP 5830A
AREA %

RT	AREA	AREA %
0.69	211400000	98.173
0.83	3686000	1.805
2.75	16920	0.008
4.40	15160	0.007
6.67	760	0.003
7.23	11210	0.005
9.63	3794	0.002

MF: 1.0000 E+ 0